A5 – APPENDIX 5 VEGETATION TREATMENT METHODS SOP'S AND GUIDELINES.

Appendix 5. Vegetation treatment methods standard operating procedures and guidelines (adapted from Table 2-5 in the Final programmatic report for vegetation treatments on Bureau of Land Management Lands in 17 western states [Nevada State Office 2007b]).

Resource Element	Treatment Method	
	Mechanical	Chemical
Guidance Documents	BLM Handbook H-5000-1 (*Public Domain Forest Management*), and manuals 1112 (*Safety*) and 9015 (*Integrated Weed Management*).	BLM Handbook H-9011-1 (*Chemical Pest Control*), and manuals 1112 (*Safety*), 9011 (*Chemical Pest Control*), 9015 (*Integrated Weed Management)*, and 9220 (*Integrated Pest Management*).
General	• Ensure that power cutting tools have approved spark arresters. • Ensure that crews have proper fire-suppression tools during the fire season. • Wash vehicles and equipment before leaving weed infested areas to avoid infecting weed-free areas. • Keep equipment in good operating condition.	• Prepare a spill contingency plan in advance of treatment. • Select herbicides that are least dangerous to the environment while providing the desired results. • Minimize the size of treatment areas, where feasible. • Use the least amount of herbicide necessary to achieve the desired result. • Follow product label for use and storage. • Have a licensed applicator apply herbicides. • Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location. • Dispose of unwanted herbicides promptly and correctly.
Land Use	• Collaborate on project development with nearby landowners and agencies.	• Consider surrounding land uses before aerial spraying. • Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents and landowners. • Post treated areas and specify reentry times, if appropriate.

Appendix 5 (continued).

Resource Element	Treatment Method	
	Mechanical	Chemical
Air Quality See Manual 7000 (*Soil, Water, and Air Management*).	• Maintain equipment in optimal working order. • Conduct treatment activities during the wetter seasons. • Use heavy equipment under adequate soil moisture conditions to minimize soil erosion. • Minimize vehicle speeds on unpaved roads. • Minimize dust impacts to the extent practicable.	• Consider effects of wind, humidity, temperature inversions, and heavy rainfall on herbicide effectiveness and risks. • Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph (6 mph for aerial applications) or rainfall is imminent. • Apply herbicides consistent with label directions. • Use drift reduction agents, as appropriate, to reduce the drift hazard. • Select proper application equipment (e.g., equipment that produces 200- to 800-micron diameter droplets). • Select proper application methods and use appropriate buffer distances between spray sites and non-target resources.
Soil Resources See Manual 7000 (*Soil, Water, and Air Management*).	• Assess the susceptibility of the treatment site to soil damage and erosion prior to treatment. • Time treatments to avoid intense rainstorms. • Time treatments to encourage rapid recovery of vegetation. • Further facilitate revegetation by seeding or planting following treatment. • Use equipment that minimizes soil disturbance and compaction. • Minimize use of heavy equipment on slopes >20%. • Conduct treatments when the ground is sufficiently dry to support heavy equipment. • Implement erosion control measures in areas where heavy equipment use occurs. • Minimize disturbances to biological soil crusts (e.g., by timing treatments when crusts are moist). • Reinoculate biological crust organisms to aid in their recovery, if possible. • Conduct mechanical treatments along topographic contours to minimize runoff and erosion. • When appropriate, leave plant debris on site to retain moisture, supply nutrients, and reduce erosion. • Consider chaining when soils are frozen and plants are brittle to minimize soil disturbance.	• Assess the susceptibility of the treatment site to soil damage and erosion prior to treatment. • Minimize treating areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected. • Minimize the use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility. • Time treatments to encourage rapid recovery of desirable vegetation. • Further facilitate revegetation by seeding or planting following treatment.

Appendix 5 (continued).

Resource Element	Treatment Method	
	Mechanical	Chemical
Water Resources See Manual 7000 (*Soil, Water, and Air Management*).	• Minimize removal of desirable vegetation near residential and domestic water sources. • Do not wash equipment or vehicles in water bodies. • Maintain minimum 25- foot wide vegetated buffer near streams and wetlands.	• Consider climate, soil type, slope, and vegetation type when developing herbicide treatment programs. • Do not rinse spray tanks in or near water bodies. • Do not broadcast herbicide pellets where there is danger of contaminating water supplies. • Minimize treating areas with a high risk for groundwater contamination. • Maintain buffers between the treatment area and water bodies. Buffer widths should be developed based on herbicide- and site-specific criteria to minimize impacts to water bodies.
Wetlands and Riparian Areas	• Manage riparian areas to provide adequate shade, sediment control, bank stability, and recruitment of wood into stream channels. • Following treatment, reseed or replant with native vegetation if the native plant community cannot recover and occupy the site sufficiently.	• Use appropriate herbicide-free buffer zone for herbicides not labeled for aquatic use based on risk assessment guidance, with minimum widths of 100 feet for aerial, 25 feet for vehicle, and 10 feet for hand spray applications. • Following treatment, reseed or replant with native vegetation if the native plant community cannot recover and occupy the site sufficiently.
Vegetation See Handbook H-4410-1 (*National Range Handbook*), and manuals 5000 (*Forest Management*) and 9015 (*Integrated Weed Management*).	• Power wash vehicles and equipment to prevent the introduction and spread of weed and exotic species. • Remove damaged trees and treat woody residue to limit subsequent mortality by bark beetles. • Use plant stock or seed from the same seed zone and from sites of similar elevation when conducting revegetation activities. • Use lighter chains with 40 to 60 pound links where the objective is to minimize disturbance to the understory species. • As appropriate, use two chainings to reduce tree competition and prepare the seedbed. Carry out the second chaining at the most advantageous time for seeding (late fall or early winter, in most cases). • Do not chain in areas where annual rainfall is less than 6-9 inches, especially if downy brome is present. • Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. • Consider adjustments in the existing grazing permit, including the application of state or regional grazing administration guidelines, needed to maintain desirable vegetation on the treatment site.	• Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species. • Use the appropriate application rate to treat weeds and other noxious vegetation to minimize effects to non-target vegetation. • Conduct pre-treatment surveys for sensitive habitat and species of concern within and adjacent to proposed treatment areas. • Identify and implement any temporary domestic livestock grazing and/or supplemental feeding restrictions needed to enhance desirable vegetation recovery following treatment. • Consider adjustments in the existing grazing permit, including the application of state or regional grazing policies and administration guidelines, needed to maintain desirable vegetation on the treatment site. • Use plant stock or seed from the same seed zone and from sites of similar elevation when conducting revegetation activities.

Appendix 5 (continued).

Resource Element	Treatment Method	
	Mechanical	Chemical
Fish and Other Aquatic Resources See Manual 6500 (*Wildlife and Fisheries Management*).	• Minimize treatments adjacent to fish-bearing waters. • Do not wash vehicles in streams or wetlands. • Refuel and service equipment at least 100 feet from water bodies to reduce the chance for pollutants to enter water. • Maintain adequate vegetated buffer between treatment area and water body to reduce the potential for sediments and other pollutants to enter the water body.	• Use appropriate buffer zones based on label and risk assessment guidance. • Minimize treatments near fish-bearing streams during periods when fish are in life stages most sensitive to the herbicide(s) used. • Use spot, rather than aerial treatments, near water bodies. • Use herbicides that are least toxic to fish and still effective.
Wildlife Resources	• Minimize treatments during nesting and other important periods for birds and other wildlife. • Retain wildlife trees and other unique habitat features where practical. • Design chaining treatments to provide a mosaic of treated and nontreated sites. No more than 50% of an area should be chained at one time. Provide natural travel lanes, resting and thermal cover areas, snags, and corridors (>30 feet wide) connecting non-chained areas. Size of clearing should not exceed 100 yards at its widest point.	• Minimize treatments during nesting and other important periods for wildlife. • Use herbicides of low toxicity to wildlife, where feasible. • Conduct pre-treatment surveys for sensitive habitat and wildlife species of concern. • Avoid using glyphosate formulations that include R-11 in the future, and either avoid using any formulations with POEA, or seek to use the formulation with the lowest amount of POEA available, to reduce risks to amphibians. • Minimize use of herbicides near wetlands and riparian areas with amphibians.
Threatened and Endangered Species See Manual 6840 (*Special Status Species*) and *Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States Programmatic Biological Assessment.*	• Minimize use of ground-disturbing equipment near special status species of concern. • Survey for species of concern if project could impact these species. • Use temporary roads when long-term access is not required.	• Survey for special status species before treating an area.

Appendix 5 (continued).

Resource Element	Treatment Method	
	Mechanical	Chemical
Livestock See Handbook H-4120-1 (*Grazing Management*).	• Notify permittees of proposed treatments and identify any needed livestock grazing, feeding, or slaughter restrictions. • Design treatments to take advantage of normal livestock grazing rest periods, when possible, and minimize impacts to livestock grazing permits. • Provide alternative forage sites for livestock, if possible. • Notify permittees of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment.	• Notify permittees of proposed treatments and identify any needed livestock grazing, feeding, or slaughter restrictions. • Design treatments to take advantage of normal livestock grazing rest periods, when possible, and minimize impacts to livestock grazing permits. • Provide alternative forage sites for livestock, if possible. • Use herbicides of low toxicity to livestock, where feasible. • As directed by the herbicide label, remove livestock from treatment sites prior to herbicide application, where applicable. • Take into account the different types of application equipment and methods, where possible, to reduce the probability of contamination of non-target food and water sources. • Notify permittees of the project to improve coordination and avoid potential conflicts and safety concerns during implementation of the treatment.
Wild Horses and Burros	• Avoid critical periods and minimize impacts to habitat that could adversely affect wild horse or burro populations.	• Minimize use of herbicides in project areas actively grazed by wild horses and burros, and/or use herbicides with low toxicity to reduce potential impacts. • Remove wild horses and burros from identified treatment areas prior to herbicide application, in accordance with label directions for livestock. • Take into account the different types of application equipment and methods, where possible, to limit the probability of contaminating non-target food and water sources. • Avoid critical periods and minimize impacts to habitat that could adversely affect wild horse or burro populations.

Appendix 5 (continued).

Resource Element	Treatment Method	
	Mechanical	Chemical
Paleontological and Cultural Resources See handbooks H-8120-1 (*Guidelines for Conducting Tribal Consultation*) and H-8270-1 (*General Procedural Guidance for Paleontological Resource Management*), and manuals 8100 (*The Foundations for Managing Cultural Resources*), 8120 (*Tribal Consultation Under Cultural Resource Authorities*), and 8270 (*Paleontological Resource*	• Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the National Programmatic Agreement and state protocols or 36 CFR Part 800, including necessary consultations with the State Historic Preservation Officers and interested tribes. • Follow BLM Handbook H-8270-1 to determine known Condition 1 and Condition 2 paleontological areas, or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. • Identify cultural resource types at risk from mechanical treatments and design inventories that are sufficient to locate these resources. Provide measures to minimize impacts. • Identify opportunities to meet tribal cultural use plant objectives for projects on public lands. • Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected, adversely or beneficially, by mechanical treatments.	• Follow standard procedures for compliance with Section 106 of the National Historic Preservation Act as implemented through the National Programmatic Agreement and state protocols or 36 CFR Part 800, including necessary consultations with the State Historic Preservation Officers and interested tribes. • Follow BLM Handbook H-8270-1 to determine known Condition 1 and Condition 2 paleontological areas, or collect information through inventory to establish Condition 1 and Condition 2 areas, determine resource types at risk from the proposed treatment, and develop appropriate measures to minimize or mitigate adverse impacts. • Identify opportunities to meet tribal cultural use plant objectives for projects on public lands. • Consult with tribes to locate any areas of vegetation that are of significance to the tribe and that might be affected, adversely or beneficially, by herbicide treatments.

Appendix 5 (continued).

Resource Element	Treatment Method	
	Mechanical	Chemical
Visual Resources See handbooks H-8410-1 (*Visual Resource Inventory*) and H-8431-1 (*Visual Resource Contrast Rating*), and Manual 8400 (*Visual Resource Management*).	• Minimize dust drift, especially near recreational or other public use areas. • Minimize loss of desirable vegetation near high public use areas. • At areas such as visual overlooks, leave sufficient vegetation in place, where possible, to screen views of vegetation treatments. • Minimize earthwork and locate away from prominent topographic features. • Revegetate treated sites. • Lessen visual effects in Class I and Class II visual resource areas. • Design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established VRM objectives.	• At areas such as visual overlooks, leave sufficient vegetation in place, where possible, to screen views of vegetation treatments. • Minimize use of broadcast foliar applications in sensitive watersheds to avoid creating large areas of browned vegetation. • Consider the surrounding land use before assigning aerial spraying as an application method. • Avoid aerial spraying near agricultural or densely populated areas, where feasible. • Minimize off-site drift and mobility of herbicides (e.g., do not treat when winds exceed 10 mph; avoid treating areas where herbicide runoff is likely; establish appropriate buffer widths between treatment areas and residences). • Lessen visual effects in Class I and Class II visual resource areas. • When restoring treated areas, design activities to repeat the form, line, color, and texture of the natural landscape character conditions to meet established VRM objectives.
Wilderness and Other Special Areas See handbooks H-8550-1 (*Management of Wilderness Study Areas (WSAs)*), and H-8560-1 (*Management of Designated Wilderness Study Areas*), and Manual	• Use the least intrusive methods possible to achieve objectives, and use non-motorized equipment in wilderness and off existing routes in wilderness study areas, and where possible in other areas. • If mechanized equipment is required, use the minimum amount of equipment needed. • Time the work for weekdays or off-season. • Require shut down of work before evening if work is located near campsites. • If aircraft are used, plan flight paths to minimize impacts on visitors and wildlife. • Revegetate sites with native species if there is no reasonable expectation of natural regeneration. • Maintain adequate buffers for Wild and Scenic Rivers.	• Revegetate disturbed sites with native species if there is no reasonable expectation of natural regeneration. • Use chemicals only when they are the minimum method necessary to control weeds that are spreading within the wilderness or threaten lands adjacent to the wilderness. • Give preference to herbicides that have the least effect on non-target species and the wilderness environment. • Implement herbicide treatments during periods of low human use, where feasible. • Maintain adequate buffers for Wild and Scenic Rivers.

Appendix 5 (continued).

Resource Element	Treatment Method	
	Mechanical	Chemical
Recreation See Handbook H-1601-1 (*Land Use Planning Handbook*).	• Control public access until potential treatment hazards no longer exist. • Schedule treatments to avoid peak recreational use times, unless treatments must be timed during peak times to maximize effectiveness. • Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas.	• Adhere to entry restrictions identified on the herbicide label for public and worker access. • Post signs noting exclusion areas and their duration. • Schedule treatments to avoid peak recreational use times, unless treatments must be timed during peak times to maximize effectiveness. • Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas.
Social and Economic Values	• Post treatment areas. • Notify adjacent landowners, grazing permittees, the public, and emergency personnel of treatments. • Control public access to treatment areas. • Consult with Native American tribes and Alaska Natives whose health and economies might be affected by the project. • To the extent feasible, hire local contractors and purchase supplies locally.	• Observe restricted entry intervals given on herbicide labels. • Post treated areas and specify reentry or rest times, if appropriate. • Notify adjacent landowners, grazing permittees, the public, and emergency personnel of treatments. • Control public access until potential treatment hazards no longer exist. • Consult with Native American tribes and Alaska Natives whose health and economies might be affected by the project. • To the degree possible within the law, hire local contractors and purchase supplies locally.
Rights-of-way	• Coordinate vegetation management activities where joint or multiple use of a ROW exists. • Notify other public land users within or adjacent to the ROW proposed for treatment. • Apply appropriate safety measures when operating equipment within utility ROW corridors. • Minimize exposed soil areas during treatment. • Keep operations within prescribed ROW.	• Coordinate vegetation management activities where joint or multiple use of a ROW exists. • Notify other public land users within or adjacent to the ROW proposed for treatment. • Use only herbicides that are approved for use in ROW areas. • Take precautions to minimize drift by not applying herbicides when winds exceed > 10 mph (6 mph for aerial applications) or a serious rainfall event is imminent. • Use drift control agents and low volatile formulations.

Appendix 5 (continued).

Resource Element	Treatment Method	
	Mechanical	Chemical
Human Health and Safety	• Wear appropriate safety equipment and clothing, and use equipment that is properly maintained. • Cut all brush and tree stumps flat, where possible, to eliminate sharp points that could injure a worker or the public. • Ensure that only qualified personnel cut trees near powerlines.	• Use protective equipment as directed by the herbicide label. • Maintain adequate buffer widths between treatment area and residences, municipal water supplies, and recreation areas. • Post treated areas with appropriate signs at common public access areas. • Provide public notification in newspapers or other media where the potential exists for public exposure. • Have a copy of Material Safety Data Sheets at work sites. • Notify local emergency personnel of proposed treatments. • Contain and clean up spills and request help as needed. • Secure containers during transport.